Spring 2018

Watermelon Cold Stress Testing for Cold Intolerant Seeds

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Watermelon Cold Stress Testing for Cold Intolerant Seeds

By

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A creative component submitted to the graduate faculty

In partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Seed Technology and Business

Program of Study Committee:
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Iowa State University
Ames, Iowa
2019

ABSTRACT

Watermelon sales and production for Company X is a lucrative business. Watermelon is scientifically known as *Citrullus lanatus* (Thunb.) Matsum. & Nakai. Watermelon sales for Company X are directed to Georgia, Florida and Spain. These areas make up 80% of Company X's watermelon seed sales. One major stress factor in these areas is low temperature during watermelon transplant season. Growers interested in selling their produce at the fall harvest markets must transplant the seedlings between February and April. This creative component outlines how watermelon transplants are produced in greenhouses, and what growing conditions are necessary in a field environment. It also outlines temperature trends and fluctuations in the targeted areas of Georgia, Florida and Spain. The cold stress testing has been historically used to help predict seed lot performance in the field in cooler climates and can be used to predict performance in potentially cold climates like Georgia, North Florida and Spain. Company X was interested in developing their own cold stress test to screen seed lots for cold susceptibility and to reduce bad emergence claims for the company. The objective of this project was to develop a test for screening seed lots based on germination and growth in cold temperatures. The road to this test took several steps from prescreening 47 watermelon seed lots to growing watermelon seeds in greenhouses to mimic cold conditions. A difference between primed and unprimed seed lots was observed throughout this experiment. Primed seeds are seed treated with a seed-germination-enhancement treatment. Primed seeds are thus at the same stage of physiological activation and germinate uniformly. Unprimed seeds do not undergo this process; therefore, unprimed seeds germinate at different rates due to different maturity levels and seeds ability to absorb water for imbibition. Ultimately thresholds for mean germination rate in primed seeds were set to identify seed lots that were cold tolerant and help direct the sales of primed seeds.

Unprimed watermelon seeds performed differently and required a different testing protocol to help predict poor emergence in cold conditions. Ideally, unprimed seeds would not be sold to potentially colder climates. However, due to the large market size for watermelon, unprimed seeds also must be screened for cold susceptibility. The threshold for acceptable mean germination rates for unprimed seeds is set higher to reduce the risk of poor emergence claims. The outcome from this project was the development of two test protocols to rank primed and unprimed watermelon seed lots for emergence in cold environments.

****This submission only represents an abstract from a project that was presented and approved by the students Graduate Faculty Committee. Because the complete creative component project contained proprietary company information, the student is only able to share this version of the project to the online repository.**